The April to June issues have been omitted
(See notice on page 88)

ENTOMOLOGICAL NEWS

JULY 1950

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JAMES A. G. REHN

ENTOMOLOGICAL NEWS

VOL. LXI JULY, 1950 No. 4

James A. G. Rehn Completes Fifty Years of Research

The members of the American Entomological Society have taken a great deal of pleasure in commemorating this year the fifty years of service of one of its oldest and best friends. On June 1, 1900, Mr. James A. G. Rehn joined the staff of the Academy of Natural Sciences of Philadelphia. Although he became a resident member of our entomological society only in 1910, he was an Associate in the Entomological Section of the Academy from almost the same date that he joined the Academy staff. As the Society and the Section were practically synonymous, his services to the Society were virtually in effect since the turn of the century.

In this age of dashing about from one occupation to another, it is gratifying to find a man who decided early in life what he wished to do and who gained an abounding enthusiasm for it which he was able to maintain undiminished for fifty years. Mr. Rehn came to work at the Academy when he was about nineteen years old. In the intervening years he has attained an enviable reputation as one of the world's outstanding orthopterists, and at the same time has served the institution for which he works in many important ways. He has labored successively at the Academy as Assistant Curator; Associate Curator of Insects; and since 1933 as Curator in that department. He has also served as Recording Secretary, Secretary, Secretary of the Council and of the Board of Trustees, and at the present time is Corresponding Secretary. In the latter position he has maintained contact with many of the world's best-known natural scientists.

In the American Entomological Society, Mr. Rehn's activities have been just as constant and varied. For many years he has constantly played some vital role in the conduct of its affairs, having acted at various times as Vice-president, President, Editor of the Transactions, and currently as Treasurer of the organization. The very extensive insect collections of the Society and of the Academy are in his charge, and for a long period he has aided visiting entomologists who have come in large numbers to examine insect material. He has also done the many and varied chores which fall to the lot of the Curator of an important department.

Aside from Mr. Rehn's services at the two Philadelphia institutions, he has been active in many other organizations. He is a fellow and past president of the Entomological Society of America; a charter member of the Society of Mammalogists and of the Society for the Study of Evolution; a member of the Society of Systematic Zoologists and of the Society of Sigma Xi; a fellow of the American Geographical Society and of the American Association for the Advancement of Science; and a fellow and past-president of the Delaware Valley Ornithological Club. During the first World War he served with the Military Intelligence Division of the U. S. Army, Counter-espionage control.

His contributions to scientific literature have been very extensive. Mr. Rehn entered the field of natural science at a period when the old-fashioned naturalist was just about to become extinct; when taxonomists were just entering into the higher and more glorified status of specialists. However, there still remained a remnant of the idea that breadth of knowledge in a general field was a wholesome virtue. Thus we see reflected in his earlier activities, and to some extent in his writing, a greater diversity in subject matter than is often encountered today. His sixteen earlier publications in Mammalogy, and four as joint author, illustrate this point. The order Orthoptera has, however, been his main interest in later years, and about 227 papers stand to his personal credit in this field. In addition, 41 were published jointly with Morgan Hebard and 15 with his son, John W. H. Rehn. This mass of published data places him

among the half dozen most productive scientific writers on the Academy staff in the nearly 140 years of its history. No other entomologist who has been a member of this Society has ever achieved this record.

At present Mr. Rehn is engaged—at the request of the Australian government—in the preparation of a comprehensive work on the grasshoppers of Australia. Two volumes, of a possible five or six, are partially completed.

Over a period of many years he has worked on the accumulation of material for a monograph on the Orthoptera of North America. In this work he has been assisted chiefly by Morgan Hebard and by his son, John W. H. Rehn. The work is expected to occupy about four volumes of 500 or more pages each. For a period of over 45 years Mr. Rehn, alone or with his coworkers, has covered most of the United States in a series of many collecting expeditions.

Outside the United States similar expeditions have been numerous, including trips to Africa, Colombia, Costa Rica, Honduras and Brazil. Largely through his efforts, and those of Morgan Hebard, a collection of Orthoptera has been built at the Academy which now exceeds half a million specimens—the finest in the world.

At its last Spring meeting, on May 25, the American Entomological Society devoted its session to a commemoration of Mr. Rehn's 50 years of service. Many friends and their wives were present. A gift was presented by members in appreciation of his work for the Society.

On June 1 the Academy of Natural Sciences called a meeting in its library, of staff members and friends of Mr. Rehn, this being the exact 50-year anniversary of his first official connection with the institution. An engrossed resolution from the Board of Trustees of the Academy was presented by its president, Mr. Charles M. B. Cadwalader. The text of this resolution is reproduced below.

"Whereas Mr. James A. G. Rehn, Curator of Insects of the Academy of Natural Sciences of Philadelphia, on June 1, 1950,

will have served the Academy as a member of the staff for fifty years and,

"Whereas Mr. Rehn's scientific attainments expressed in his important research, many publications, collections and expeditions have been recognized by the scientific world, thus bringing honor and distinction to the institution,

"Be it resolved by the Board of Trustees of the Academy of Natural Sciences of Philadelphia that the gratitude and appreciation of the Academy be made a permanent part of the records of this institution by being included in the official minutes, and further be it resolved that the Secretary is instructed to transmit to Mr. Rehn a copy of this resolution."

(Signed by the President and Managing Director.)

The members of the American Entomological Society and Mr. Rehn's many friends wish him long added years of satisfying work.

M. E. P.

Notice

Due to circumstances beyond the control of the editor and of the Society, ENTOMOLOGICAL NEWS has been far behind schedule for a number of years. In order to correct this condition it was decided, with the permission of the Post Office Department, to omit the April, May and June numbers from the current volume, so that the present (July) number will actually appear during its proper month. This July number will then be followed by the usual October, November and December numbers. Although Volume 61 will therefore consist of only seven separate issues rather than the usual ten, we hope to be able to increase the size of these issues in order that the completed volume will approximate normal size.

New Coleoptera with Notes. II. (Buprestidae and Cerambycidae)

By JOSEF N. KNULL, The Ohio State University *

Acmaeodera barri Caz.

Acmaeodera barri Cazier, 1940, The Wasmann Collector 4: 58.

This species was taken on living smoke tree (*Parosela spinosa* (Gray)) in California at Palm Springs, Riverside Co., June 20, Coyote Wells, Imperial Co., July 16 and Topock, Ariz., June 4, by D. J. and J. N. Knull. It breeds in branches of living trees and many adult emergence holes were observed.

Paratyndaris crandalli Knull

Paratyndaris olneyae crandalli Knull, 1941, Ann. Ent. Soc. Amer., 34: 694; Vogt, 1949, Ann. Ent. Soc. Amer., 42: 195.

More material is now available which will justify raising this form to specific rank.

In addition to Starr County, Texas records by Vogt, specimens were taken on dead mesquite branches in Webb Co., ten miles south of Laredo, Zapata Co., and northern Frio Co., Texas, May 20–22 by D. J. and J. N. Knull.

Cinyra prosternalis Schffr.

Cinyra prosternalis Schaeffer, 1904, Jour. N. Y. Ent. Soc., 12: 205; Schaeffer, 1905, Bul. Brook. Inst. Arts & Sci., 1: 128; Chamberlin, 1920, Ent. News, 31: 242; *Psiloptera riograndei* Knull, 1937, Ent. News, 48: 16, new synonymy; Vogt, 1949, Ann. Ent. Soc. Amer., 42: 196.

In addition to records given by Vogt, specimens have been collected on living capote (*Diospyros texana* Scheele) as far west as Pecos River in Val Verde Co., Texas. As pointed out by Vogt, it breeds in healthy capote and living trees in that section show many adult emergence holes. In parts of Texas this tree is frequently allowed to remain along highways for ornamental purposes.

* Contribution from Department of Zoology and Entomology.

Agrilus geronimoi n. sp.

♀. Size, form and color of *A. quercus* Schffr.; color dark brown with aeneous tinge; head and pronotum opaque; elytra and ventral surface shining; head, pronotum around edges and elytra ornamented with short recumbent white pubescence; design of elytra similar to that of *A. lecontei* Saund., elytra with large denuded area back of scutellum, extending along suture and more expanded back of middle.

Head convex, slight trace of median depression; surface finely strigate; antennae serrate from fifth segment.

Pronotum wider than long, narrower at base than at apex, widest in apical third; sides broadly rounded in front, converging toward base, sinuate near base; when viewed from side, marginal and submarginal carinae widely separated in front, joined some distance from base; anterior margin sinuate, median lobe broad; basal margin sinuate, emarginations not deep; disk convex, with broad median depression extending from base to near apex, oblique depression each side along lateral margin; prehumeral carinae faint; surface finely transversely strigate. Scutellum glabrous, transversely carinate.

Elytra at base about as wide as base of pronotum; sides subparallel in front, expanded back of middle, then gradually narrowed to rounded, serrulate apices; disk convex, basal depressions well marked, costae absent; surface finely, transversely strigate near base, rest of elytra finely imbricate.

Abdomen beneath finely punctate, uniformly clothed with short, white, recumbent pubescence; pygidium without projecting carina. Prosternal lobe broadly rounded; prosternal process with sides parallel to behind coxal cavities, then abruptly narrowed to apex. Posterior tarsi shorter than tibiae, first segment not as long as next three united. Tarsal claws similar on all feet, cleft, inner tooth broad and shorter than outer one, apices not turned inward.

Length 5.5 mm.; width 1.6 mm.

Holotype ♀ collected at about 4,000 ft., Chiricahua Mountains, ARIZONA, June 27, 1949, by D. J. and J. N. Knull, in collection of author.

According to Fisher's key [1] this species runs to *A. quercus* Schffr. It is distinguished by elytral design similar to *A. lecontei* Saund., lack of elytral costae and by marginal and submarginal carinae being joined some distance from base.

Megacyllene snowi (Csy.)

Cyllene snowi Casey, 1912, Mem. on Coleop. III, 353; Hopping, 1937, Ann. Ent. Soc. Amer., 3: 443.

Larvae found working in the bases of living locust (*Robinia neomexicana* Gray) saplings in Oak Creek Canyon and Williams, Arizona. The larva works into root of tree, frequently causing it to break off just above ground. Pupation occurs in root just below surface of ground. Adults emerge in August and are quite variable in color pattern.

Elytroleptus immaculipennis Knull

Elytroleptus floridanus immaculipennis Knull, 1935, Ent. News, 46: 99.

Two more specimens of this species convince me that it is distinct from *floridanus* Lec. and is of specific rank. It is shorter, elytral costae less evident and pubescence of pronotum red instead of yellow as in *floridanus*. A female specimen was collected in Davis Mountains, Texas, July 3, 1940, by D. J. and J. N. Knull.

A ♀ collected at same locality and date has basal fourth of elytra reddish yellow and extending obliquely to costal margin, then running along side to near apex. Color of light area on elytra differs from *floridanus*. Light area of pronotum is red as in *immaculipennis*. I propose the varietal name *obliquus* for this form.

Length 7.4 mm.; width 2.8 mm.

Holotype in collection of author.

Elytroleptus lineatus n. sp.

♀. Narrow elongate; shining, head, prothorax, anterior legs all but coxae and tarsi, middle and posterior femora all but bases and apices yellow, rest of ventral surface and legs dark brown, antennae black, elytra reddish yellow.

[1] W. S. Fisher, U.S.N.M. Bul. 145, 1928.

Head convex; surface densely, coarsely punctured, clothed with long yellow pubescence; antennae stout, scape longer than other segments, second segment about as broad as long, third longer than fourth, fifth longer than third, following segments decreasing in length, eleventh longer than tenth, appendiculate, segments five to ten inclusive serrate, first five segments with longer black pubescence.

Pronotum wider than long, widest in middle, wider at base than at apex; sides broadly rounded from base to apex; disk convex, an oblong lateral depression each side, transverse depression at base, apex transversely margined; surface irregularly rugose, with irregular large punctures, long yellow pubescence dense.

Elytra at base wider than pronotum, elongate; sides subparallel near base, gradually widened to apical fifth, then broadly rounded to suture; disk convex with three longitudinal costae on each elytron, rest of surface densely, finely punctured, reddish yellow pubescence dense.

Abdomen beneath shining, minutely punctured, pubescence long, fine. Anterior and middle femora clavate.

Length 8.1 mm.; width 2.4 mm.

Holotype ♀ collected in Davis Mountains, TEXAS, June 21, 1949, by D. J. and J. N. Knull, in collection of author. The narrow elongate form together with the two tone dorsal color will separate this species from our known forms. It should come next to *E. davisi* Knull.

Adetus muticus (Thoms.)

Agennopsis mutica Thomson, 1857, Archives Ent. 1, 302; *pygmaea* Bates, 1866, Ann. Mag. Nat. Hist., ser. 3, 17: 295; *mexicana* Thomson, 1868, Physis II, 153; *Adetus muticus*, Bates, 1872, Trans. Ent. Soc. Lond., 234; Bates, 1880, Biol. Centr. Amer. Col. V: 106, 341, t. 8, f. 4; Belon, 1902, Soc. Ent. Belg. XLVI, 464, 471.

A specimen of what I take to be this species was collected at light five miles north of Nogales, Arizona, July 7, 1949, by D. J. and J. N. Knull. It agrees with determined specimens in the F. R. Mason Collection.[2]

[2] The writer expresses appreciation to J. A. G. Rehn for privilege of studying collections in Phila. Acad. Nat. Sci.

A New Species of the Genus Lissagenia Banks (Hymenoptera: Psammocharidae) from Central America

By R. R. Dreisbach, Midland, Michigan

Banks (1) erected the genus Lissagenia for two South American species which he described as new at the time, *L. flavipennis, L. insignis,* and he also included the species *Priocnemella difformis* Banks. He designated the species *L. flavipennis* as the genotype.

This genus, like Alasagenia, has a beard of hairs on the mentum which are quite long and which bend forward slightly, but it differs from that genus mainly by the absence of small teeth on the posterior tibiae, but has instead, a row of very small spines on the apical half or more of the dorsal surface and a row on each side. There are three other characters which also separate it from Alasagenia, namely: the posterior tibiae, when seen from behind, are much more sinuous, especially at the base on the outer side, the pronotum is slightly angulate on posterior edge, instead of transverse, the ocelli are in a much smaller triangle, and the lateral are twice as far from the eye margins as they are apart, instead of these distances being about equal. The pronotum is also somewhat flatter than in Alasagenia.

Lissagenia hubbelli n. sp.

Holotype female: Completely black all over, with beautiful golden, mat, pubescence, very much like *Alasagenia fulgifrons* (Cresson except that this pubescence is much denser and covers a much greater part of body), over the whole face, front, vertex, and posterior orbits, slightly less dense on neck, pronotum, mesonotum and scutellum; all the coxae, more or less, thorax above middle coxae, base of propodeum, the outer, apical corners of propodeum, and the clypeus, with white sericeous hairs; the clypeus much less densely pubescent than the rest of head, truncate in front, and with a smooth wide reddish border, a slight reddish tinge to the front edge of clypeus just back of the

smoothed front edge; clypeus rather long and raised above the mouth parts, slightly raised in the middle, when seen from the side; the vertex is barely raised above the eye surface, when seen from the side, but the whole front from vertex to antennae is considerably raised above the eyes, increasing in amount from vertex to antennae; when seen from in front the vertex rises perpendicularly for a very short distance at the eyes, the rest of surface flat and entirely raised above eyes; a few long upright hairs on vertex and front but more numerous and longer ones on and under the clypeus, with a beard of long hairs on mentum; long white hairs on neck and a few on fore coxae; ocelli in a high, very small triangle, the fore ocellus slightly more than its diameter from the laterals and these twice as far from eye margins as they are from each other; comparative lengths of the first four and last antennal joints: 35 : 15 : 60 : 50 : 30; antennae very long and slender, longer than the head and thorax; maxillary palpi slender with five segments, the first short, the second thicker and somewhat club-shaped; labial palpi, three jointed, thicker and much shorter; pronotum rather short with a slight angulation in middle of posterior edge, almost flat on dorsal surface; mesonotum only slightly longer, with a slightly curved dorsal surface, and narrowing from the tegulae to the scutellum where it and the scutellum are only one-half as wide as the width at tegulae; the propodeum extends in a smooth curve from base to apex, the apical half with fairly broad, low transverse ridges which are stronger on the edges; a few upright hairs on mesonotum and propodeum; the wings beautifully marked and very conspicuous; fore wings with a dark band covering the basal veins and a second broader one covering the marginal, second and third cubital, the apical three-quarters of third discoidal and the basal half of second apical cells, with the tip of fore wings beyond the dark band a deep milky white; the wings between the bands and basad of the basal band, slightly smoky; the rear wings hyaline except that the tip beyond the transverse median vein is smoky; marginal cell large, broader than the second cubital cell and as long as its distance to wing tips; second cubital cell small, one-half as long as third which is large and extends beyond the marginal

cell; first recurrent meets the second cubital cell before the middle, and the second recurrent meeting the third cubital cell at the basal two fifths; basal vein in fore wings slightly basal of the transverse, and the subdiscoidal in rear wings meets the discoidal vein before the origination of the cubitus; abdomen definitely petioled, the petiole hour-glass shaped, and the abdomen widest at the apical three-fourths of second tergite from where it tapers to a slender point; the whole surface covered with a fine, powdery, white, sericeous pubescence, somewhat localized over the surface; the last tergite covered with the golden pubescence of head, with numerous long whitish or slightly golden hairs on dorsal surface, sides, and the ventral surface; a deep transverse groove on second ventrite, the segments two to four with a silvery patch of white pubescence at the outer, apical corners; legs very long, no tarsal comb and no spines on fore femora or tibiae except two small spines on under side of tibiae and a semi-circle of long spines on the dorsal tip; no spines on the last two pair of femora but these tibiae have a row of small spines on dorsal surface and on the sides; when seen from behind the posterior tibiae have the outer side incurved at the base; tarsi with fine spines over the whole surface of the first four joints, all the legs with fairly long spines, beneath, the last pair of all legs with no spines underneath, but only hairs; claws rather long and with a fairly long tooth at apical third; ratio of lengths of femora, tibiae, and tarsal joints of hind legs as follows: 40:45:35:15:10:5:7; longer spur of posterior tibiae about one-third length of its metatarsal joint.

Length: Head and thorax 4.3 mm., abdomen 4.7 mm., forewing 7.0 mm., rear wing 5.2 mm.

Holotype female: Dept. Morazon, Cerro Uyuca, Honduras, 5900 ft.–6100 ft., (Cloud forest) VII–24–1948, T. H. Hubbell No. 139 (Mus. Zool. Uni. Mich.).

This is the first record of this genus from North America. It cannot be confused with any of the South American species due to the golden pubescence (somewhat similar to *Alasagenia fulgifrons* (Cresson)), and the two dark bands on the wings.

This will go in my keys (2) to the genera of females for the subfamily Auplopodinae (Pseudageniae) for North America as follows: First part of couplet 5,

5. A group of long curving or straight bristles or hairs on mentum.....5a
5. No such group of hairs on mentum.....6
5a. No distinct teeth on posterior edge of hind tibiae; only small spines hind tibiae when seen from behind with a slight curvature on the outside near the base; pronotum slightly angulate and almost flat; ocellar triangle much smaller, with the lateral ocelli twice as far from the edge of eyes as they are apart.....*Lissagenia* Banks
5a. Distinct, though small, teeth on the posterior edge of hind tibiae; hind tibiae, when seen from behind, hardly curved at the base; pronotum transverse, not at all angulate, and not quite flat; ocellar triangle larger, with the lateral ocelli just about as far apart as they are distant from the edge of eyes.....*Alasagenia* Banks
6. [Proceed as in keys *l.c.*]

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1. Banks, N. A. Bull. Mus. Comp. Zool., 96, 1946, p. 456.
2. Dreisbach, R. R. Papers Mich. Acad. Sci. Arts and Letters, 1949, p. 65.

Note on the Identity and Distribution of Hemitrichus rufipes Thomson (Hymenoptera: Pteromalidae)

By A. B. Gahan, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, United States Department of Agriculture, and George E. Wallace, Section of Entomology, Carnegie Museum

Hemitrichus rufipes was originally described from Sweden. The U. S. National Museum collection contains a female collected in the vicinity of Vienna and a male from Böheimkirchen, Austria, both identified by F. Ruschka; also 2 females collected by J. Fahringer in the vicinity of Vienna, and 1 female from Angern, Austria, sent in by H. L. Parker and identified by

Gahan by comparing with the Ruschka determined material and with Thomson's description. The last-mentioned specimen bears a label "? Ex Bruchus," indicating a doubtful host record. Nothing further is known concerning hosts and distribution of the species in Europe.

Occurrence of the species in America was recorded in a note by the junior author published in 1949. The specimens upon which this record was based were collected in Pittsburgh, Pa., and were identified by comparing them with the above-mentioned European material. Subsequently, while examining some pteromalids from the collection of the Natural History Survey of Illinois, specimens collected by Wm. A. Nason at Algonquin, Ill., in 1896 were recognized as being *H. rufipes*. Further investigation revealed that in 1896 Ashmead had described what he supposed to be a new genus and new species, *Uriella rufipes* Ashm., based in part upon a series of specimens having the same origin and data as those just mentioned. The actual holotype of *Uriella rufipes* Ashmead, as recorded in the type catalog of the U. S. National Museum, is the specimen mentioned in the description as having been bred by F. M. Webster from *Botis erectalis* Grote, and is from Ohio. The host label on this specimen bears a question mark, indicating that the host association was uncertain. This holotype and the eight paratypes collected by Nason are all alike and appear to be identical in every way with the European material of *Hemitrichus rufipes* Thom. The genus *Uriella* Ashmead must therefore be considered a synonym of *Hemitrichus* Thomson and the species *rufipes* Ashmead a synonym of *rufipes* Thomson.

Two other occurrences of *H. rufipes* remain to be mentioned. One specimen, received from R. R. Driesbach, is labeled as having come from a "pine cone gall" on *Salix* sp. collected in Elizabeth County, Michigan, Sept. 11, 1937. The other record concerns several specimens received for identification from L. C. Kuitert and which were taken by him in Morris County, Kansas, in April 1948 in association with *Ptinus hirtellus* Sturm and *Oryzaephilus surinamensis* (L.) infesting pack-rat droppings. Prof. Kuitert has published an account of his observa-

tions on this association in The Florida Entomologist, vol. 33, p. 177, 1949.

It is evident from these records that *H. rufipes* is a widely distributed species. Its real host relationships are not clear. The fact that the host associations listed (some of them as doubtful) include Lepidoptera, Diptera, and Coleoptera would seem to indicate a likelihood that some of these records are wrong.

Kurdjumov (Revue Russe d'Entomologie, vol. 13, pp. 3, 4; 1913) placed *Uriella* Ashm. in synonymy with *Phaenacra* Foerster. Cotypes of *Phaenacra nubigera* Foerst. (the genotype species) are in the U. S. National Museum, and although they superficially resemble the genotype of *Uriella,* the two genera are not closely related. *Phaenacra* belongs to the tribe *Merisini* and is believed not to be separable from *Merisus* Walker. *Hemitrichus* (= *Uriella*) belongs in the tribe *Metastenini.*

Hemitrichus rufipes is easily recognized in both sexes by the following characters: The clypeus is perfectly smooth and shining with a sharp median tooth on its anterior margin; the parapsidal grooves are almost entirely effaced; the propodeum is strongly and nearly uniformly punctate and without either a median carina or lateral folds; the marginal vein is distinctly swollen at base; the posterior tibia has two distinct spurs; the abdomen of the female is conic-ovate with the first tergite perfectly smooth, the others weakly reticulated but shining, the ovipositor sheaths shortly exserted. The color in both sexes is aeneous black, with the scape pedicel and all legs (except their coxae) bright reddish testaceous.

Synonymic Bibliography

1878 *Dimachus* (*Hemitrichus*) *rufipes* Thomson, Hymenoptera Scandinaviae, vol. 5, p. 54.

1896 *Uriella rufipes* Ashmead, Trans. Amer. Ent. Soc., vol. 23, pp. 221–223.

1898 *Hemitrichus rufipes* (Thom.) Dalla Torre, Cat. Hymen., vol. 5, p. 88.

1898 *Uriella rufipes* (Ashm.) Dalla Torre, *op. cit.,* p. 91.

1904 *Hemitrichus rufipes* (Thom.) Ashmead, Mem. Carnegie Mus., vol. 1, no. 4, pp. 276, 377.
1904 *Uriella rufipes* (Ashm.) Ashmead, *op. cit.*, pp. 323, 392.
1909 *Hemitrichus rufipes* (Thoms.) Schmiedeknecht, Genera Insectorum fasc. 97, p. 287.
1909 *Uriella rufipes* (Ashm.) Schmiedeknecht, *op. cit.*, p. 361.
1923 *Hemitrichus rufipes* (Thom.) Gahan & Fagan, U. S. Nat. Mus. Bull. no. 124, p. 70.
1923 *Uriella rufipes* (Ashm.) Gahan & Fagan, *op. cit.*, p. 151.
1949 *Hemitrichus rufipes* (Thom.) Wallace, Ent. News, vol. 60, no. 2, p. 30.

Ants from Saipan, Marianas Islands

By Neal A. Weber, Swarthmore College, Swarthmore, Pennsylvania

Professor R. K. Enders kindly collected for me ants on Saipan during the summer of 1949 while he was engaged in mammal studies for the Pacific Science Board under the auspices of the Office of Naval Research. These ants were principally those species coming to his mammal skinning tables and therefore represent a sampling of the scavenging, adaptable species.

The records are also of interest in representing one of the far-flung Pacific Islands, comparatively few of which have been explored from an entomological point of view until recent years. From Guam, some 125 miles south southwest, Wheeler (1912) listed 21 species of ants. From Bikini Atoll, about 1200 miles east, Cole (1949) enumerates 13 species taken in 1947. There are doubtless numerous collections made in the 1940's whose records are not presently available from this and other islands of the area.

The ants of these three islands reflect the general nature of ant distribution in the Pacific. Each contains tropicopolitan species as the chief element of the fauna. All three contain the large *Odontomachus haematoda,* the sole tropicopolitan species of the primitive ant subfamily, the Ponerinae, although a second species taken by Dr. Enders may represent another ponerine

becoming tropicopolitan. Each has two tiny species of *Monomorium* (*destructor* and *floricola*) of the subfamily Myrmicinae. Bikini has a third species of this genus, *pharaonis,* which has a greater distribution than the other two since it is adapted to life in heated apartment houses extending to the very center of the United States while the others are tropical or subtropical. The myrmicine, *Solenopsis geminata rufa,* widespread in the Pacific, is present on Saipan and Guam but absent from Bikini; *geminata* itself is neotropical and spreading. Saipan and Guam have the myrmicine, *Tetramorium guineense,* with the genus represented on Bikini by another tropicopolitan species of the genus, *simillimum,* whose original home was probably Africa. *Tapinoma melanocephalum,* a tiny and widespread member of the Dolichoderinae, occurs on all three islands as does the worldwide and ubiquitous formicine, *Paratrechina longicornis,* along with *Nylanderia bourbonica,* the latter being paleotropical. *Camponotus reticulatus* subspecies and *C. chloroticus,* present on Guam and Bikini but absent from the Saipan collection, did not come to the skinning tables though other species of the genus (as *maculatus*) do so in other tropical areas.

None of the lists contains a clear-cut endemic species. Wheeler, however, described a new variety and a subspecies of widespread species from Guam.

The Saipan ants and their distribution are given below.

1. *Leptogenys* (*Leptogenys*) *maxillosa* (F. Smith)

A species evidently becoming tropicopolitan since known from a number of islands in the Indian Ocean, from South Africa, the Anglo-Egyptian Sudan and several of the West Indian islands. A worker which I took in Cuba of the subspecies *falcata* Roger differs chiefly in having the anterior clypeal margin angulate instead of convex. Arnold's figure of the South African form also shows the clypeal margin angulate although my Sudan specimens have this part convex as in the Saipan ants. The ants are predatory, quick in their movements and sting painfully.

2. *Odontomachus haematoda* (L.)

Tropicopolitan; large, dark brown and stinging painfully; generally carnivorous.

3. *Pheidole,* near *rinae tipuna* Forel

Although Wheeler recorded *P. javana* Mayr from Guam, the present species in the soldier caste is much smaller and less glabrous. It is also much smaller than *oceanica* and *bolabolensis.* The Saipan soldier is close to *rinae* subsp. *tipuna* Forel but has a distinctly shorter head and is also close to the *rinae* subsp. *incensa* Wheeler types in the American Museum of Natural History.

4. *Pheidole* sp.

Workers of a second species, impossible of identification without the soldier caste, differ in being smooth, shiny and dark rather than being densely punctate and pale.

5. *Cardiocondyla emeryi* Forel

One dealate female of this cosmopolitan species.

6. *Vollenhovia pedestris* F. Smith

Not in the Guam or Bikini lists. The workers agree well with Mann's British Solomon specimens; subspecies are known from New Guinea, the Seychelles, Borneo, the Philippines and other paleotropical localities.

7. *Monomorium destructor* (Jerdon)

Tropicopolitan; tiny and reddish yellow.

8. *Monomorium floricola* (Jerdon)

Tropicopolitan; even smaller than the preceding and a shiny dark brown in color.

9. *Solenopsis geminata* subspecies *rufa* (Jerdon)

Showing the mesosternal spine characteristic of this widespread paleotropical form of the cosmopolitan species. I have

this also from the island of Samar, Philippines (U.S.N.). Safford (1905) says of this form on Guam that "these little creatures when out on foraging expeditions, travel in lines and sting every animal that crosses their path. Sometimes young chickens are killed by them. They are common in houses, and it is not unusual on turning in at night to find a line of them crossing the bed." I have observed similar habits in the typical neotropical form.

10. *Tetramorium guineense* (Fabr.)

A common tropicopolitan species with generalized habits.

11. *Tapinoma melanocephalum* (Fabr.)

Tropicopolitan and a house pest where it often feeds on greasy substances.

12. *Technomyrmes albipes* F. Smith?

One worker with gaster and petiole missing may well be this paleotropical species.

13. *Plagiolepis* (*Anoplolepis*) *longipes* (Jerdon)

A large, spindly, paleotropical species.

14. *Paratrechina* (*Nylanderia*) *bourbonica* Forel

A species chiefly of the islands of the Indian and Pacific Oceans. A colony with alate females was taken in the packing about radio parts in a box in a warehouse.

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A New Species of Epicauta from Arizona (Col.: Meloidae)

By Lawrence S. Dillon, A. & M. College of Texas

During the course of a study on the Meloidae of Texas, the following new species from Arizona was found among a lot of material received from the museum of the University of Michigan. Up to the present time, *E. ochrea* LeConte was the sole representative of the genus *Epicauta* in North America which possessed moniliform antennae and the form described here is of particular interest in sharing this character. The secondary sexual structures are likewise shared by the males of the two species.

The author is indebted to Dr. Theodore H. Hubbell, Curator of Insects at the Museum of Zoology of the University of Michigan, for his kindness in loaning the specimens.

Epicauta moniliformis n. sp.

Fuscous, shining, sparsely covered with cinereous pubescence. Elytra yellow-testaceous or ferruginous-cinereous, with very indistinct scutellar and humeral maculae. Abdominal sternites in part ferruginous.

Entire upper surface minutely alutaceous and rather densely, finely punctate. Head rounded from vertex to eyes, one-fifth wider than long; eyes large, one and one-half times as long as interocular width, two-thirds wider than infraocular area; antennal callosities slightly prominent, glabrous. Pronotum narrowly campanuliform, as long as wide, one-seventh narrower than head; disk with a deep median sulcus not reaching apex, basal impression shallow, transverse. Protibiae with a single robust spur in male; mesotibial spurs rather short, acute; metatibial spurs acute, tapering, slightly concave on inner face, the inner spur distinctly longer. Protarsi in male with first segment short, contorted, and toothed. Antennae short, scarcely surpassing base of elytra, nearly uniform in thickness, segments from second moniliform; scape strongly arcuate, thickened apically, in male attaining hind margin of eye, in female scarcely

attaining middle of eye; second segment as long as third; third about one-fourth as long as first in male, two-fifths as long in female; rest subequal, feebly shorter than third.

Length 11–12 mm.

Holotype male and *allotype* female: Palmerlee, ARIZONA, July 11 (H. A. Kaeber) [University of Michigan].

Remarks: This species has moniliform antennae as found in *E. ochrea* (LeConte), to which species it is quite closely allied. From *ochrea* it is distinct in having the scape reaching just to the hind margin of eye in male, not beyond it, and in female likewise shorter, not attaining middle of eye. In addition, the entire body is fuscous, except the elytra, which are ferruginous, and the body form is much more slender.

Zethus, Pachodynerus and other Southern Wasps from Massachusetts (Hymenoptera: Vespoidea; Sphecoidea)

By KENNETH W. COOPER, Department of Biology, Princeton University

On the old Fay estate at Woods Hole, Cape Cod, Massachusetts, standing in an open field near the margins of a predominantly beech-black oak woods, there is a single, compact, large clump of a cultivated grape (*"Vitis macrophylla,"* according to the gardner) that blooms late in the season. Its flowers prove very attractive to aculeate wasps in early August, and on August 7, 1948, Dr. Jean Pasteels, of the Université Libre de Bruxelles, and myself made a noteworthy capture of three female specimens of typical *Zethus* (*Zethusculus*) *spinipes* (Say). This is believed to be the northernmost record so far published for the species, and the first record of its occurrence in Massachusetts. Dr. J. C. Bequaert, of Harvard University, has a specimen from Buttenwood, Rhode Island. It is known from two Long Island records in New York, and has also been found only rarely in New Jersey. Although by no means a very uncommon wasp in the South, it is definitely a rarity in New England. The

capture of three specimens at Woods Hole, along with Dr. Bequaert's recent unpublished record from Rhode Island, makes it very likely that it is a native in New England, and not an infrequent visitor.

The grape remained in flower only until August 10th, but no additional *Zethus* were seen. August 8th a very striking and wholly unfamiliar *red* eumenid (at first mistaken for a *Rygchium*) was taken at the grape blossoms and subsequently identified by Dr. Bequaert to be *Pachodynerus erynnis* (Lepel.). Originally described from the "Carolinas," *P. erynnis* is most commonly taken in Florida. Its known range extends west to Louisiana and north to Georgia. Whether or not the Woods Hole specimen was an accidental introduction onto the Cape can only be surmised. Probably it was, but it should be pointed out that quite a number of wasps, including *Zethus,* more characteristic of southerly climes, live in the sand and pine coastal strip along the southern Cape. For example, among others, *Arachnophroctonus ferrugineus* (Say), *Batazonus interruptus* (Say), *Pompilioides americanus* (Pal. de Beauv.), *Pseudomethoca geryon* (Fox), *Ps. simillima* (Sm.), *Ps. sanbornii* (Blake), *Ephuta puteola* (Blake), *Campsomeris quadrimaculata* (Fab.), *Notogonidea argentata* (Pal. de Beauv.), *Priononyx bifoveolatum* (Tasch.), *Isodontia auripes* Fern., and *Alyson melleus* Say, have all been collected by me at Woods Hole. On this score, C. W. Johnson (1930, Pub. Nantucket Maria Mitchell Assoc., vol. 3) has briefly commented on insects and plants whose normal ranges extend from Georgia and Florida coastwise to Nantucket and even farther to the North.

In addition to the *Zethus* and *Pachodynerus,* the following vespids were also attending the grape: *Eumenes fraternus* Say, *Odynerus* (*Rygchium*) *rugosum* Sauss., *O.* (*R.*) *leucomelas* Sauss., *O.* (*R.*) *hidalgo* var. *boreo-orientalis* J. Beq., *O.* (*R.*) *boscii* Lepel., *Ancistrocerus birenimaculatus* (Sauss.), *A. unifasciatus* (Sauss.), *Monobia quadridens* (L.), *Vespa* (*Vespula*) *arenaria* Fab., and *Polistes fuscatus* (Fab.). One male of *Monobia* had a female stylopid exserted between the fourth and fifth abdominal tergites of the left side.

Arthropods of Possible Medical Significance Collected in Terrell County, Texas

By R. B. EADS and B. G. HIGHTOWER, State Department of Health, Austin, Texas

With the Big Bend National Park of Texas rapidly becoming a major tourist attraction, this Department is endeavoring to obtain fairly complete information relative to the medically important anthropods in the area. Consequently, we were greatly appreciative of the opportunity presented the junior author to accompany Dr. W. Frank Blair, University of Texas Mammalogist, and his students on a field trip to West Texas (Terrell County) June 6 to July 8, 1949.

The majority of the mammals collected were examined for ectoparasites. An unexpectedly light mammal population was encountered and the small number of rodents seen were supporting, for the most part, small or no ectoparasite infestations. Some attention was directed toward the collection of arthropods other than ectoparasites. The taxonomic status of this material has been determined and is presented here.

ECTOPARASITE INDEX OF HOSTS

Rodentia

7 *Citellus variegatus* (Rock Squirrel): 11 *Pulex irritans;* 40 *Echidnophaga gallinacea;* 107 *Diamanus montanus;* 1 *Ixodes cookei;* 1 *Dermacentor parumapertus;* 27 *Haemolaelaps glasgowi;* 1 *Neohaematopinus laeviusculus.*

3 *Sciurus niger* (Tree Squirrel): 10 *Orchopeas howardii;* 18 *Neohaematopinus sciurinus.*

10 *Cratogeomys castanops* (Pocket Gopher): 200 plus *Geomydoecus geomydis* (heavy infestation); 4 *Hirstionyssus* sp. (being described by Strandtmann and Hunt); 16 *Haemolaelaps glasgowi.*

7 *Perognathus merriami* (Pocket Mouse): 24 *Androlaelaps* sp. (apparently undescribed).

Lagomorpha

2 *Lepus californicus* (Jack Rabbit): 12 *Haemaphysalis leporis-palustris;* 3 *Dermacentor parumapertus;* 2 *Hoplopsyllus affinis.*

Artiodactyla

2 *Tayassu angulatum* (Javelina): 100 *Juxtapulex porcinus;* 25 *Pecaroecus javalli.*

Chiroptera

5 *Pipistrellus hesperus* (Canyon Bat): 1 *Myodopsylla collinsi;* 5 *Spinturnix* sp.; 5 *Liponyssus haemotophagus;* 4 *Ornithodoros* sp. (larvae).

Carnivora

3 *Bassariscus astutus* (Ring Tailed Cat): 1 *Pulex irritans.*

4 *Procyon lotor* (Raccoon): 95 *Pulex irritans;* 4 *Echidnophaga gallinacea;* 1 *Ixodes cookei.*

Arthropods Not Ectoparasitic

Diptera

Aedes atropalpus—Larvae common in temporary rain water held in rocky depressions. Adults were common.

Anopheles punctipennis—No larvae found. Adults were not numerous.

Anopheles pseudopunctipennis—No larvae found. Three adult females taken.

Callitroga macellaria—Adults of the secondary screw worm fly were commonly encountered about every fresh mammal carcass observed.

Musca domestica—Abundant.

Sarcophaga bishoppi, S. plinthophyga, S. fulvipes triplasia and *S. sueta* were common.

Phorocera tachinomoides—Three of these tachinid flies were taken.

Tabanus sp. and *Silvius* sp.—Tabanids were numerous. *Silvius* were especially common along the Pecos River, viciously attacking humans as well as domestic animals. All specimens of this family were so battered when they reached Mr. H. J. Reinhard, Texas A. & M. College, that he was unable to place them specifically.

Coleoptera

Epicauta atrivitala—A single specimen of this large blister beetle was taken.

Acknowledgments: The following persons kindly assisted in determining this material: George C. Menzies and Dorothy Eben, Texas State Department of Health; H. J. Reinhard, Texas A. & M. College; Glen M. Kohls, Rocky Mountain Laboratory; and R. W. Strandtmann, Texas Technological College. The Javelina lice were determined by the Division of Insect Identification, United States Department of Agriculture. The mammals were identified by W. F. Blair, University of Texas.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1950 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

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Review of Straub's Work on Odonata

Among papers of European publication received within the last two years, one of the most noteworthy is that by **Eberhard Straub,** from the Zoological Institute of the University of Bonn, entitled STADIEN UND DARMKANAL DER ODONATEN IN METAMORPHOSE UND HÄUTUNG, SOWIE DIE BEDEUTUNG DES SCHLÜPFAKTES FÜR DIE SYSTEMATISCHE BIOLOGIE (Stages and alimentary canal of the odonata in metamorphosis and moulting, as well as the significance of the act of transformation for systematic biology). It appeared in the Archiv für Naturgeschichte, N. F., Bd. 12, Heft 1, Leipzig, 1943, pp. 1–93, 12 tables, 13 figs., 1 pl.

Its scope may be perceived from its table of contents (translated): I. Introduction. II. Fundamentals, A. Material, B. Technique, C. General terms, D. Special object: *Aeschna cyanea* Müller. III. Moulting and transformation stages: A. Derivation of a generally applicable method for the identification of the stages of Odonate metamorphosis, B. External course of metamorphosis of *Ae. cyanea,* C. Moulting stages of *Ae. cyanea.* IV. Alimentary canal, tracheae and transverse muscles of *Ae. cyanea,* A. Technique, B. Alimentary canal in situ before metamorphosis, C. Metamorphosis of the alimentary canal and of the rectal tracheae, D. Metamorphosis of the transverse muscles, E. Functions of the rectum. V. Abdominal cuticle and flight muscles of *Ae. cyanea* in metamorphosis. VI. Generalization and discussion of the processes of metamorphosis. VII. Transformation and moulting of the Odonata. VIII. Systematic-biological results of the study of transformation. IX. Summary. Abbreviation list. List of literature.

These researches began at Basle, at the incitation of Prof. A. Portmann and were based on 18 species, belonging to 7 families. The localities in Switzerland for the species are given with suggestions for the transport and rearing of living larvae and imagos.

The author believes that the greatest exactness and reliability in dealing with the developmental stages is to be attained by the determination of a fixed point in the middle of the transformation period. This ideal fixed point he found in a withdrawal

stage of the labium. He chose as zero the moment, in the middle of that period, when the imaginal labium has been withdrawn to one-half the length of the lateral margin of the larval labium, as shown at *Me½* in fig. 13f (following page 82). From 0 out he designates the days with arabic numerals. After 0 they bear positive signs, before 0 negative signs. The method is illustrated in two elaborate tables: 11. External course of metamorphosis of *Ae. cyanea,* following page 82, and 12, Metamorphosis of the gut of *Ae. cyanea,* anatomical findings, following page 84.

The author's rearing normal is determined by a tolerably constant room temperature of about 20 C., sunlight excluded, and optimal food intensity. Under these conditions, eight larvae of *cyanea* went through the last instar in 28 days (range 26–30).

The morphology of the eye region, its changes and homologies are treated on pp. 20–23, the wing rudiments and the labium pp. 23–27, caudal appendages and abdominal processes pp. 27–29.

As a result of experimental feeding he determined that in no case did larvae of *cyanea* seize Tubifex worms after stage − 4¼ days. The earliest respiration through the spiracles occurred at − ½ day. Reduction of locomotion by expulsion of water from the rectum ("Rückstossschwimmen") took place at stage + 1¼ days at the earliest, but complete cessation not before + 1¾; about 1¼ days before the appearance of the imago the larva has completely lost this peculiar faculty.

The author's histological finds of his study of the transforming gut, tracheae and transverse muscles are promised for a later paper. The terminology of the tracheal trunks employed by authors from Reaumur, 1742, to the present work is shown in Table 3, page 43. The metamorphosis of the rectal tracheae is described in detail, pp. 48–52. Tillyard's terminology of the rectal gills is discussed; his terms simplex and duplex systems, holobranch and hemibranch, are rejected but his undulate, implicate, foliate and lamellate types are retained, pp. 52–54, 77.

The period from the cessation of food intake to the last (transformation) moult is designated as the chief metamorphosis

("Hauptmetamorphose"); in the laboratory it occupied nine days, on an average, in *cyanea;* in this period the chief transformation processes occur. Preceding the chief metamorphosis is a premetamorphosis from about stage − 12, the beginning of larval degeneration. Following the chief metamorphosis is the postmetamorphosis in which the rectal tracheae and some abdominal muscles break down. Table 5, page 64, gives a list of the destructive processes in the larval organs of *cyanea* by stages. Some changes in Odonate metamorphosis, especially in the Libellulinae, approach those of holometabolic insects, pp. 65–66.

Details of transformation of 12 species of European Odonata form Table 8, page 69. Four types of transformation are recognized and illustrated by outline drawings, pp. 70–72: 1. Aeschna type, head hanging down, followed by an upswing, transformation position "c" [1] (*Ae. cyanea, Cordulegaster annulatus, Somatochlora metallica*); 2. Calopteryx type, head hanging down, not followed by an upswing, position "c" (*Calopteryx*); 3. Agrion type, head never hanging down, position "b" [1] below the substrate (*Lestes viridis, Platycnemis pennipes, Agrion puella*); 4. Gomphus type, head never hanging down, position "a" [1] above the substrate (*Gomphus pulchellus* and *vulgatissimus, Onychogomphus forcipatus*), pp. 72–78. Table 9, pp. 78–79, summarizes the results of the author's observations on transformation and on moulting by systematic groups and for the Odonata as a whole. Table 10, pp. 80–81, lists the known representatives of the four types of transformation of Odonata from his own observations and from the literature, while some (e.g., *Basiaeschna janata, Didymops transversa*) are inferred from conditions displayed in exuviae, many of which latter he examined in the collection of Dr. Erich Schmidt. The author knows of no cases which can not be referred to one or other of his four types. He adds: The most important result of my researches

[1] Position "a": Standing on a substrate that is horizontal or that is inclined at any angle up to 90° from the horizontal.

Position "b": Hanging from a verticle substrate, or beneath a substrate that is inclined at any angle up to about 60° from the verticle.

Position "c": The same as "b," but the angle may be as great as 90° from the vertical, i.e., horizontal.

on transformation is the emphatically separate position of the Gomphidae. These constitute an exception in every respect. They are the only Odonata which can transform on flat ground and stretch wings and abdomen on the horizontal. The dissolution of the family Aeschnidae (sensu lato), long ago accepted on morphological grounds, has been supported on biological evidence by Portmann (1921). I find this separation confirmed anew by my observations on the act of transformation.

PHILIP P. CALVERT

Review

PORTIER, P., LA BIOLOGIE DES LÉPIDOPTÈRES. 643 pp., 392 figs. Paul Lechevalier, Paris. 1949. (Vol. 23 of Encyclopédie Entomologique.)

At the age of 84 the author has given us this lengthy book which on close inspection turns out to be an elementary presentation of this one order of insects with emphasis on chemistry and on physiological systems. Anatomical descriptions are limited to what the author considers an indispensible minimum, and classification (including means for making determinations) is omitted. The author aims to present objectively what he considers interesting. In the Preface, he deplores the simple enumeration of facts, and says, "This process permits the accumulation of a considerable mass of data in a relatively small space; it further permits the parading of a great erudition which seems to have been the grand preoccupation of certain savants and in particular of German scholars." In contrast, the present author seeks to duplicate the work on Reaumur, Fabre and Perez in making insects 'live,' and "aspires thus to awaken the love for studying Lepidoptera in the greatest possible number of young Frenchmen." This, the author sets out to do by presenting an elementary physiology which is limited to data obtained from representatives of this one order.

The book is divided into 40 chapters. First, the order is characterized, with a general treatment of insect structure. Then, a chapter on eggs is followed by 18 chapters on the various functional systems (nutrition, respiration, excretion, etc.) and habits of caterpillars, by 4 chapters on pupae, and by 11 chapters on adult butterflies and moths. Finally, 5 chapters are devoted to the action of physical and chemical agents, mimicry,

geographical distribution, edible species, and the teaching of the biology of Lepidoptera. Much detailed information is given including tabular chemical data.

Likely some allowance should be made because of the restricted communications during the war years, and also for the author's age, but the fact remains that the emphasis is on old data. Most of the work cited is prior to 1930, and very little of the literature of the last decade is mentioned. Unfortunately a large percentage of the references cited in the text are not included in the relatively short bibliography (a common but deplorable habit of numerous French authors), and the illustrations, being largely copied from standard sources, add little to the literature.

Whether or not this book will accomplish its objective of awakening young Frenchmen to a love of butterflies, it does have a certain amount of usefulness to entomologists in general. For one reared in the American educational system it is difficult to see any considerable usefulness for the volume. Personally, I would prefer that students seeking elementary treatments take more general works, rather than restrict their notions of physiology and ecology to one order of insects, and so get a broader background (ignoring the antiquity of much of the data presented).

A. GLENN RICHARDS

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

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